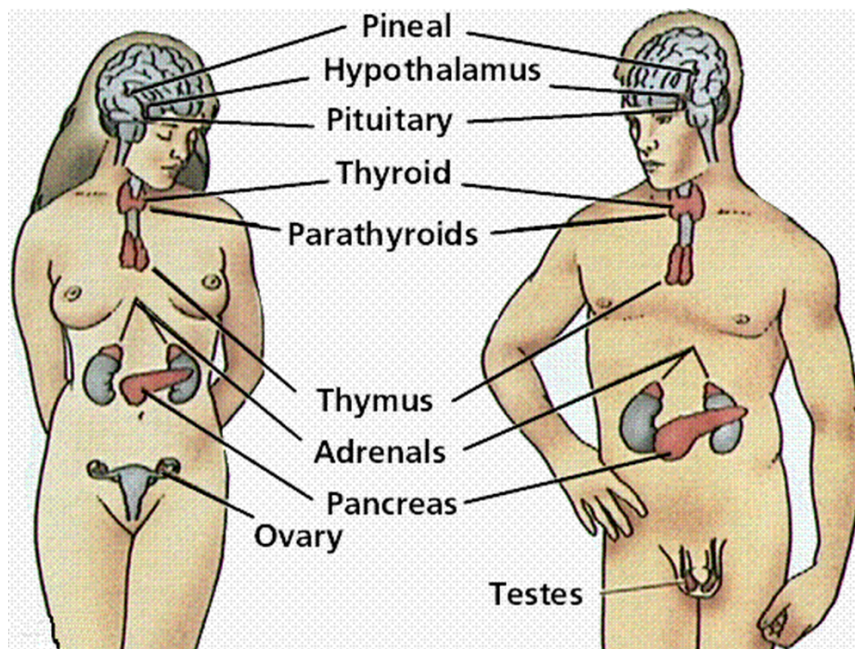


# The Endocrine System

function is to control growth, development and metabolism.....& maintain homeostasis

- done through the production of hormones (chemical messengers) in various glands found throughout the body

## Location of the Endocrine Glands

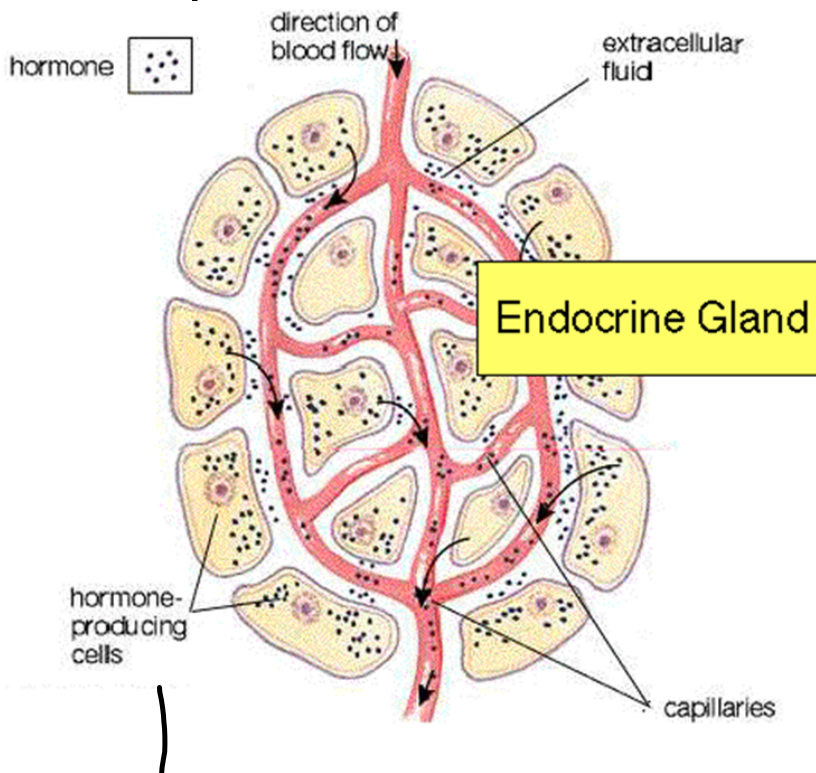


Using page 998 name the hormone(s) produce in each of the glands above.

Also explain what the hormone(s) regulates.

Gland	Hormone	Action

**Endocrine glands** secrete hormones directly into the bloodstream. The circulatory system then carries these hormones to the various organs of the body.



**Exocrine glands** release their secretions (not hormones) into ducts. These ducts then carry the secretions to body surfaces or organs.

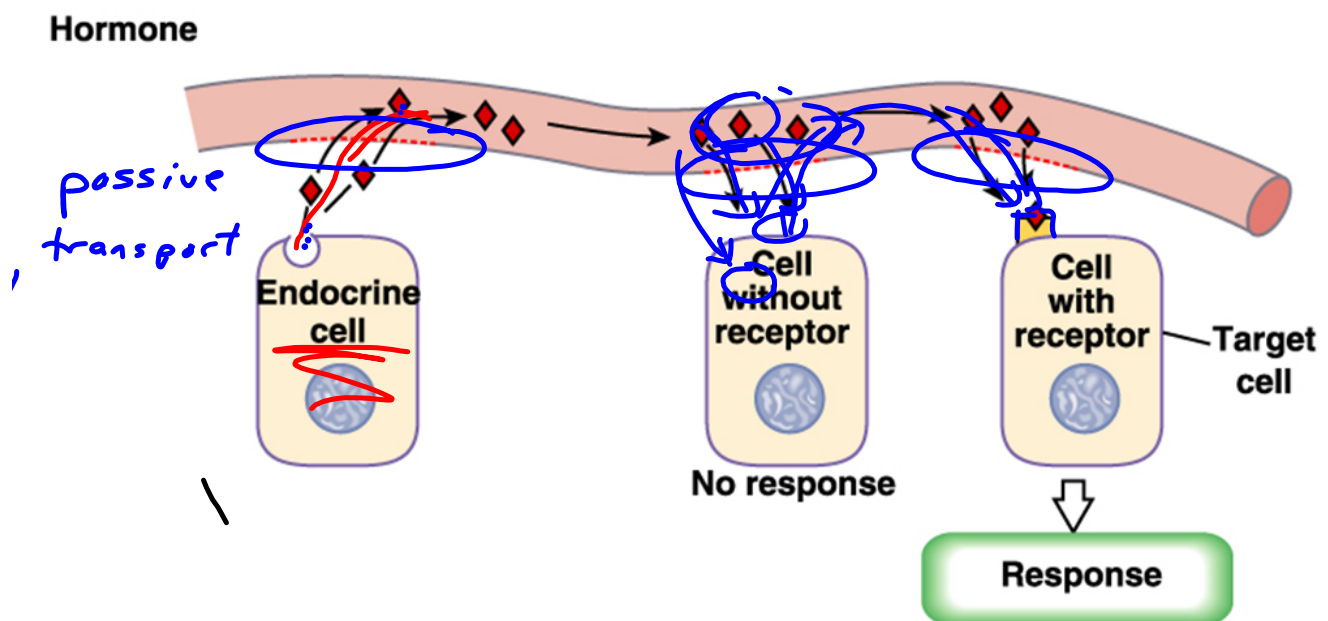
Ex. sweat glands, salivary glands, mammary glands



- What are **hormones**?

Hormones are organic chemical messengers produced and secreted by endocrine cells (found in endocrine glands) into the bloodstream.

Hormones regulate, integrate and control a wide range of physiologic functions.



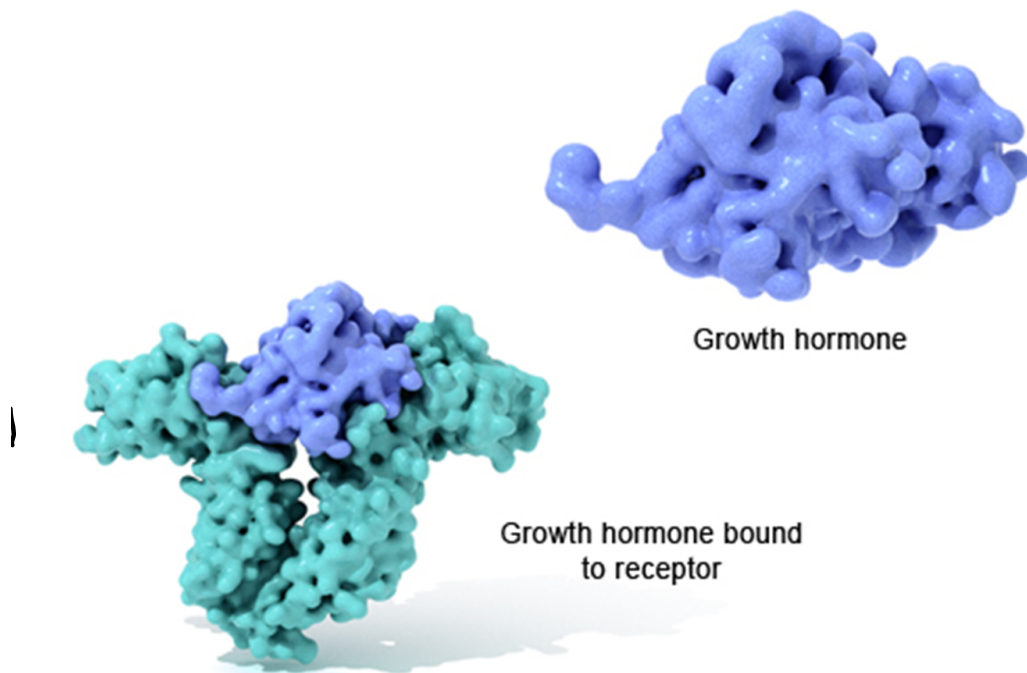
- What are **target cells**?

Target cells refer to cells that contain specific receptors (binding sites) for a particular hormone.

Once a hormone binds to receptors on or in a target cell, a series of cellular events unfold that eventually impact gene expression and protein synthesis.

# What are **hormone receptors**?

- Hormone receptors are binding sites on the target cell (either on the surface or in the cytoplasm or nucleus of the target cell)
- activated only when specific hormones bind to them. If a hormone does not/cannot bind to its receptor, then no physiologic effect results (like a key and lock).



U.S. National Library of Medicine

**Growth hormone regulates cell growth by binding to growth hormone receptors on target cells.**

## How Do Hormones Signal Cells?

There are two different types of hormones that differ in chemical structure and function.

- 1) Steroid Hormones
- 2) Non steroid Hormones (protein hormone)

### Steroid Hormones

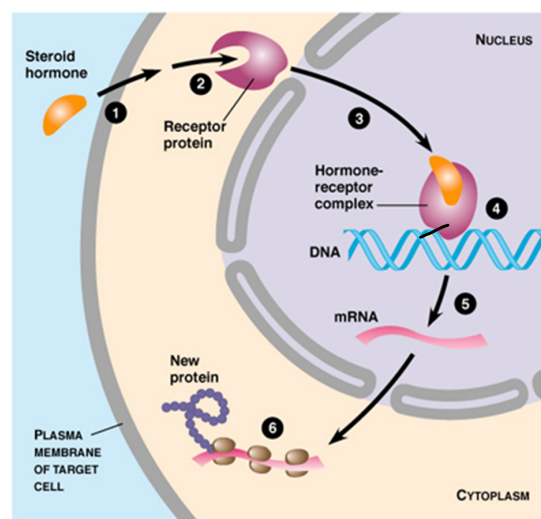
made from cholesterol - a type of lipid (fat)

are soluble in fat - therefore can pass through the cell membrane

- once inside the cell they attach to a receptor

- this complex then enters the nucleus, binds to a specific portion of DNA

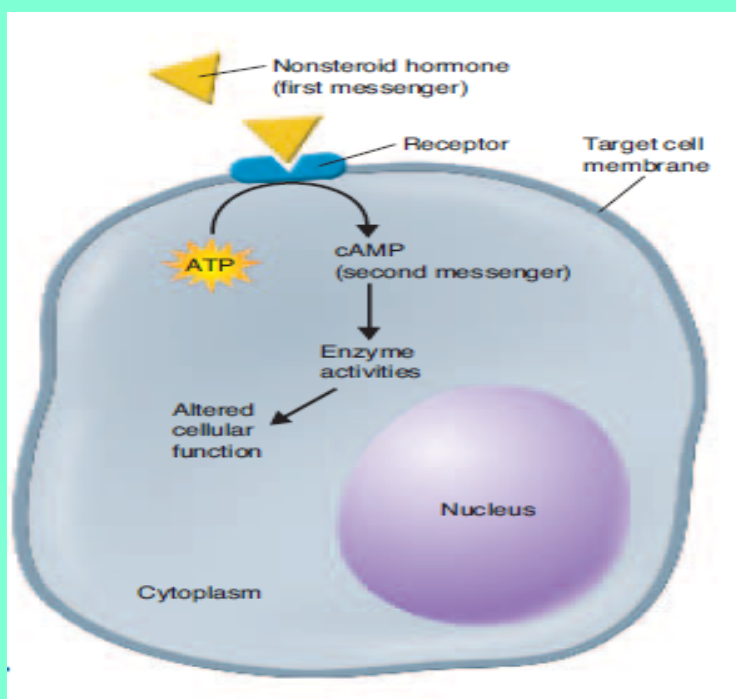
- this will activate a gene response and a message will be sent back into the cytoplasm where a ribosome will be instructed to produce a specific protein



Male and female sex hormones and cortisol are steroid hormones

## Protein Hormones - non steroid hormones

- water soluble but not fat soluble
- cannot pass through the cell membrane
- hormone binds to receptors on the cell membrane
- The hormone-receptor complex activates the production of an enzyme
- This enzyme causes the cell to convert ATP into cyclic AMP.
- AMP acts as a secondary messenger which can either activate or inhibit cell activity



## Prostaglandins

- recently discovered that all cells produce small amounts of hormones that only affect near by cells
- discovered in prostate gland, hence the name
- often cause smooth muscle to contract
- can lead to headaches - aspirin inhibits production - muscle relaxes